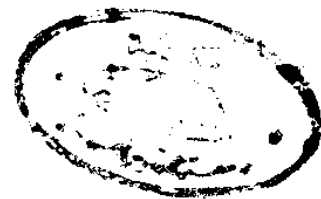


IMAGING MODALITIES OF OVARIAN LESIONS

THESIS

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BY

ISHAK GIRGIS MAKARIOUS

M.B., B. Ch.

36952

SUPERVISED BY

Dr. YOUSSEF HAMED ZAKY

Assist. Prof. of Radio-Diagnosis

Faculty of Medicine

Ain Shams University

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**INTRODUCTION
&
AIM OF THE WORK**

INTRODUCTION AND AIM OF THE WORK

The ovaries do not lend themselves readily to physical examination and are inaccessible to palpation unless they are grossly enlarged. The different clinical manifestations associated with ovarian lesions are not often conclusive and may be misleading forming a problem for the examining physician.

This has stimulated the scope for other lines of investigations which may help to assess the ovaries.

Radiological and imaging study have come to form an essential part for the investigation of the ovaries. Plain films may be helpful in the diagnosis particularly for large ovarian cysts or dermoid cysts and in some cases to differentiate them from calcified fibroids.

Hysterosalpingography may, in some cases, be resorted to as the dye may outline the ovaries and show if they are the site of a mass. However, this entails patent tubes and is not possible in virgins.

At one time, pelvic pneumography or gynaecography was an important method of examination to assess the ovaries. It often gave a good visual approach to the ovaries, their size, outline, and relation to the uterus. It was particularly helpful in virgins where clinical examination is often fruitless.

However, it is an invasive procedure and is not without risks or complications. It has been largely abandoned now with the advent of other safer techniques.

Ultrasound is now considered as the safest and surest modality for assessment of the female pelvic organs particularly the ovaries and has largely replaced other lines of examination as it is simple, non-invasive and with no radiation hazards.

CT also plays an important role in the assessment of ovarian tumours with particular consideration on metastases, ascites, para-aortic lymph nodes enlargement and pelvic wall extension.

The presence of different tools for visualisation of ovaries and their lesions with preferable specifications of each technique raises the accuracy rate of their diagnosis.

The aim of this study is to identify the presentations of different ovarian lesions by different ways of imaging wheather radiologically, ultrasonographically or CT scanning in a sequential way for each ovarian lesion.

VISUALISATION OF NORMAL OVARIES BY DIFFERENT MODALITIES

- 1. Anatomy of the ovaries**
- 2. Ultrasonographic study of the ovarian cycle**
- 3. CT scan of the ovaries**

ANATOMY OF OVARIES

the ovaries are 2 almond-shaped bodies, one on either side of the pelvis in a depression called the ovarian fossa. The position of the ovaries is somewhat variable but their long axis is usually vertical in the erect position. The right ovary is usually slightly higher than the left and the length varies from 2.5 to 5 cm. The width is ordinarily one half the length and the thickness one half the width (Meschan, 1976).

Attachment of the ovaries : Fig. (1)

1. They are attached to the back of the broad ligament by the mesovarium
2. The ovarian ligament : which passes to the cornu of the uterus and is a rounded cord of fibromuscular tissue recognizable by its whitish appearance.
3. The infundibuls pelvic ligament : which carries the ovarian vessels and lymphatics from the side walls of the pelvis (Gray, 1967).

Changes in the ovaries with age and parity :

In infancy and childhood the ovary is a tiny elongated structure with a smooth surface, situated near the pelvic brim, and packed with the primary oocytes. Although in the newborn baby, it may show small follicular cysts resulting from stimulation by chorionic gonadotrophins, it later contains only primordial or atretic follicles.

The exact position of the ovary is subject to a wide range of variation in women who have borne children as it is displaced in the first pregnancy and probably never returns again to its original position (Gray, 1967).

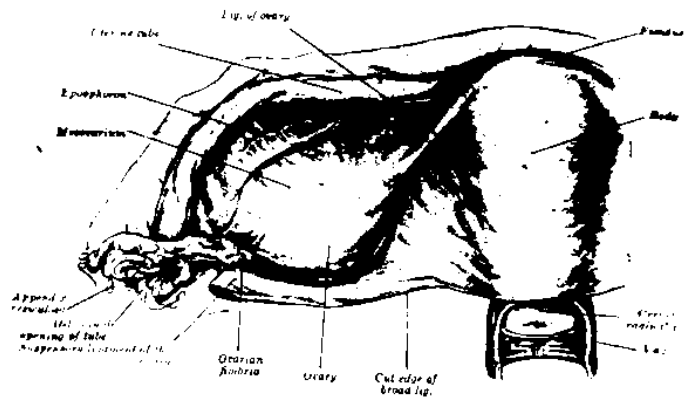


Fig (1) Anatomy of the ovary.

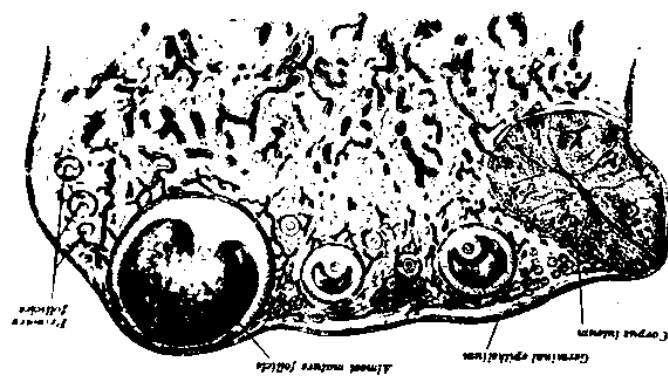


Fig. (2) A section through the ovary.

After the menopause the ovary becomes smaller in size and shrivelled in appearance. These changes are the result of atrophy of the medulla, and not of scarring following repeated ovulation as is sometimes stated. At a later age the surface becomes smooth again as in childhood. Very few follicles are found in old age (Jeffocate, 1975).

Structure of the ovaries : Fig. (2)

The ovary is divided into 3 regions :

1. The Hilum : is the small area which adjoins the mesoovarian and which receives the twigs of the ovarian vessels, lymphatics and nerves which enter from the broad ligament.
2. The Medulla (inner zone) : This subtends the hilum as a semilunar area enclosed by the cortex. It's structure is similar to that of the hilum.
3. The cortex (outer zone) : This is the specialized functioning part of the ovary forming the main mass of the organ.

It is composed of :

- a) Connective tissue stroma :

Which consists of closely packed fibres which form a dense matrix for the vessels and Graffian follicles.

Just under the covering epithelium, it is thickened to form the tunica albuginea, a dense connective tissue layer which encloses the ovary, and the presence of which gives the whitish colour to the surface of the organ.

- b) Epithelial structures :

These are :

1. Surface epithelium :

A sheet of cubical cells one layer deep which covers the free surface of the ovary as far as the hilum, where transition into the endothelium of the peritoneum takes place.

2. *The interstitial gland of the ovary:*

This consists of patches of epithelial cells scattered irregularly throughout the stroma which are inconspicuous.

3. *The Graffian follicles :*

Formed around the ova which they enclose and nourish throughout their ovarian existence. The germ cell is surrounded by the granulosa cell layer and the stroma cells immediately related to this, form the theca interna.

Only a small number of follicles however, reach full maturity. The majority undergo atresia characterised by death of the ovum and gradual degeneration and disappearance of the surrounding granulosa cell leaving behind a small cicatrised structure the corpus fibroserm (Jameison, 1969).

Relation of the ovary :

Tubal end lies near the external iliac vessels, and the terminal part of the uterine tube curves around it. Uterine end is connected by the ligament of the ovary with the uterus.

Free border : is separated from ureter only by peritoneum.

Mesovarian border: is attached to the broad ligament. Vessels and nerves enter at this border through a cleft called the hilum.

Medial surface : largely overlapped by terminal part of uterine tube, is related to pelvic colon or ileum.

The ovary lies on the side wall of the pelvis, and its lateral surface is separated by peritoneum from the umbilical artery, obturator vessels and nerves and obturator internus muscle (Jameison, 1969).

Blood supply of the ovaries :

1. **Arterial:** The ovarian arteries arise one on each side from the front of the abdominal aorta below the renal arteries opposite the second lumbar vertebra, because the ovary is developed in the abdomen and then descended.
They run downwards and slightly outwards retroperitoneally cross the ureter to reach the brim of the pelvis and pass between the layers of the outer end of the broad ligament.
It runs in the upper part of the broad ligament to the uterine cornu, where it anastomoses with the terminal branch of the uterine artery. On the way it supplies the ovary and the fallopian tubes.

2. **Venous Drainage:** The veins of the ovary accompany the arteries. They drain to pampiniform plexus of veins and from this plexus 2 ovarian veins emerge, only one of which drains the ovary. These later fuse to form a single ovarian vein. The right vein passes into the inferior vena cava and the left vein passes into the left renal vein.
These veins form the main drainage channels from the uterus especially in pregnancy.

3. **Lymphatic drainage :** Lymphatics from the ovary accompany the ovarian vessels to reach the para-aortic nodes.
They are said to communicate with those from the opposite gonad by crossing the fundus uterii, this is doubtful but is put forward as one explanation for the tendency of ovarian cancer to be bilateral.

4. **Innervation of the ovary :** The ovarian plexus of nerves accompany the ovarian vessels and is distributed to the ovary and uterine tube.
The upper part of the plexus is formed by branches from the renal and aortic plexuses, lower down it is reinforced by branches from the superior and inferior hypogastric plexuses. The nerves contain efferent and afferent

sympathetic fibres. The efferent fibres are vasomotor in nature and are derived from the tenth and eleventh thoracic segments of the spinal cord. The parasympathetic fibres are derived from the inferior hypogastric plexus and are probably vasodilator in nature (Gray, 1967).